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and the rates of clocks depend in the first place on their gravitational fields, which again are produced by the material systems concerned.

Thus the new theory of gravitation diverges widely from that of Newton with respect to its basal principle. But in practical application the two agree so closely that it has been difficult to find cases in which the actual differences could be subjected to observation. As yet only the following have been suggested:

1. The distortion of the oval orbits of planets round the sun (confirmed in the case of the planet Mercury).

2. The deviation of light-rays in a gravitational field (confirmed by the English Solar Eclipse expedition).

3. The shifting of spectral lines towards the red end of the spectrum in the case of light coming to us from stars of appreciable mass (not yet confirmed).

The great attraction of the theory is its logical consistency. If any deduction from it should prove untenable, it must be given up. A modification of it seems impossible without destruction of the whole.

No one must think that Newton's great creation can be overthrown in any real sense by this or by any other theory. His clear and wide ideas will for ever retain their significance as the foundation on which our modern conceptions of physics have been built.

ALBERT EINSTEIN

### SCIENTIFIC EVENTS

#### THE ANNUAL REPORT OF THE DIRECTOR OF THE BUREAU OF STANDARDS

A REVIEW of the work of the National Bureau of Standards for the year ending June 30, 1919, is given in the alumni report of the director of the Bureau of Standards at Washington. The report describes the functions of the bureau in connection with standards and standardization, and contains a chart and description of the several classes of standards dealt with. The director also gives a clear idea of the relation of the bureau's work to the general public, to the industries, and to the government, and includes a special statement

of the military work of the year. Brief statements are made upon practically all of the special researches and lines of testing completed or under way at the bureau. The list of these topics occupies 12 pages in the table of contents.

The bureau is organized in 64 scientific and technical sections and 20 clerical, construction and operative sections. During the year the bureau has issued 51 publications, not including reprintings, 36 of which were new and 15 revisions of previous publications. In the several laboratories of the Bureau more than 131,000 tests were made during the year. The appropriations for the year, including special funds for war investigations, were approximately \$3,000,000. A noteworthy event of the year included the completion of the industrial laboratory in which will be housed the divisions having to do with researches and tests of structural materials. The building also includes a commodious kiln house for use, among other purposes, of the ceramics division in the experimental production of new clay products and for general experimental purposes.

The report comprises 293 pages and may be obtained as long as free copies are available by addressing the Bureau of Standards, Washington, D. C.

#### NEEDS OF THE COAST AND GEODETIC SURVEY

DECLARING that the work of the United States Coast and Geodetic Survey, which provides the navigating charts which are the direct means of protecting from loss the vessels of our navy, Coast Guard, and merchant marine, is seriously hampered by lack of funds, the superintendent of the survey makes an appeal for an adequate appropriation to remedy this situation, in his annual report to the secretary of commerce.

In order to make and put these navigational charts into the hands of all who demand them both the field and office forces must be kept up to the highest standards of efficiency, and this can not be done without sufficient funds to maintain and operate modern surveying vessels and obtain able officers and crews to man them. In addition